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centals after the later Cretaceous, and the conclusion is reached that since the Placentals have radiated from a Creodont prototype beginning in the later Cretaceous period, it is quite possible that the Marsupials have during the same time radiated from a *Didelphys* prototype; there is a striking general resemblance between the early Creodonts and the opossum which tends to support this theory. It is practically the working out of a hint by Huxley in 1880, and of a very suggestive paper by Dollo upon the arboreal ancestry of the Marsupials. The idea of *Didelphys* origin, however, is original with Mr. Bensley, and the detailed comparison of the evolution of the teeth of Marsupials with that of Placentals promises to give most important and interesting results. Mr. Bensley is enjoying the extensive collections of the British Museum.

#### GEOLOGY OF THE JOHN DAY BASIN.\*

As a result of the explorations by the University of California, John C. Merriam contributes a valuable paper upon the geology of this important region in Oregon, as preliminary to the revision of the vertebrate fauna. Although this region was first reported in 1861 and explored by Condon, Marsh, Cope, Scott, Sternberg and Wortman, this is the first exact description of its geology, and is therefore most welcome and important. The author divides the beds into the Lower (250-300 feet), which is reported to contain *Oreodon*; Middle (500-1,000 feet), chiefly distinguished by *Diceratherium*; and Upper, which contained *Paracotylops*. The exact correlation of these beds with those of the Oligocene White River awaits the precise comparison and study of the faunæ. The mode of deposition has generally been considered entirely lacustrine, as the series are everywhere uniformly stratified and bedded, on the other hand, the author presents strong reasons for an æolian origin for the finer portions of these beds. In fact the problem is precisely similar to that which is now being discussed for the finer beds of the White River formation.

\* 'A Contribution to the Geology of the John Day Basin,' *Bulletin*, Dept. of Geology, Univ. of California, Vol. II., No. 9, pp. 269-314, April, 1901.

#### DISCOVERIES OF PLESIOSAURUS AND OF PORTHEUS.

During the past season Mr. Charles H. Sternberg, well known for his years of explorations in the Kansas Chalk, made two discoveries of exceptional importance. The first is of a new type of Plesiosaur, the skeleton of which is preserved in an exceptional manner; this has been purchased by the University of Kansas and will be described by Professor Williston as part of his general studies upon Plesiosaurs. The second is a remarkable skeleton of *Portheus molossus*, of the suborder Acanthopteri, family Ichthyodectidae—the characteristic predaceous fish of the Niobrara. The specimen is sixteen feet in length and is in an exceptional state of preservation. It has been purchased by the American Museum of Natural History, and will be mounted facing the great specimen of *Tylosaurus* from the Kansas Chalk which has already been described in this Journal.

H. F. O.

#### BOTANICAL NOTES.

##### SHORT NOTES ON RECENT BOOKS.

AMONG botanical books which are likely to attract attention is Dr. Wettstein's 'Handbuch der Systematischen Botanik' of which Part 1 (including pages 1 to 202) has been brought out by the Leipzig publisher Franz Deuticke. Resembling Warming's 'Haandbog i den Systematiske Botanik' and Schumann's 'Lehrbuch der Systematischen Botanik,' it promises to be much fuller and more helpful than either, and like them is to be a general survey of the structure and classification of the Vegetable Kingdom. The attempt is made to treat the subject from the phylogenetic standpoint, and whatever of success is attained in the work is largely due to this fact. In the part now issued forty-four pages are given to a general discussion of the principles involved, followed by the special discussion of representatives of the seven phyla recognized by the author, viz.: Myxophyta (including the single class *Myxomycetes*), Schizophyta (including the classes *Schizophyceae* and *Schizomycetes*), Zygophyta (including the classes *Peridineae*, *Bacillarieae* and *Conjugatae*), Euthallophyta (including the classes *Chlorophyceae* and *Fungi*, the latter in-

cluding the lichens), Phaeophyta, the brown algae, Rhodophyta, the red algae, and Cormophyta (including liverworts, mosses, ferns and their allies, and the seed-bearing plants). The work is admirably illustrated.

The appearance of the first half of the second volume of the new edition of Pfeffer's 'Pflanzenphysiologie' (Engelmann, Leipzig) is gratifying to botanists who have been using the first volume. This part covers 353 pages, indicating that Volume II. will be considerably larger than Volume I. The present half-volume includes ten chapters, as follows: (1) Growth Movements, (2) Mechanics of Growth, (3) Growth and Cell-increase, (4) Elasticity and Cohesion, (5) Tissue Tensions, (6) Influence of Environment on Growth-activity, (7) Cause of Specific Form, (8) Variation and Heredity, (9) Rhythm, (10) Resistance to extreme Influences. A hasty glance through these chapters indicates that the work maintains the high standard of the preceding volume. The second part of Volume II. is in course of preparation, and will complete the work.

Of Engler's 'Pflanzenreich' (Engelmann, Leipzig) four parts have already appeared, dealing with the families *Musaceae* (by K. Schumann), *Typhaceae* and *Sparganiaceae* (by P. Graebner), *Pandanaceae* (by O. Warburg), and *Monimiaceae* (by Janet Perkins and Ernst Gilg). The illustrations continue to be more than unusually helpful, being clear, well drawn, and judiciously selected. In the part devoted to *Pandanaceae* there are, in addition to the ordinary illustrations, four full-page 'half-tone' plates from photographs showing the gross appearance of different arboreous species with their natural surroundings.

Thomas Howell's 'Flora of Northwest America' (Howell, Portland, Or.), has reached Fascicle 4 which includes *Liguliflorae* to *Boraginaceae* (pages 387 to 474). As the author follows the Benthamian sequence it is easy to estimate by comparison with Gray's 'Manual' that the work is not more than one-half completed. The work, although marred by typographical errors (incidental to unprofessional printing) and an 'inky' page now and then, will be a very important help to the northwestern botanists.

The last-named work reminds us of a local

northwestern flora, 'The Flora of the Palouse Region,' by Charles V. Piper and R. Kent Beattie (Agricultural College, Pullman, Wash.), which appeared in May of the present year. The area covered is 70 kilometers in diameter with the town of Pullman, Wash., as a center, and includes about 24 townships in eastern Washington and 11 in western Idaho. In this region the authors describe 14 Pteridophytes, 9 Gymnosperms, 114 Monocotyledons and 526 Dicotyledons. The work of compilation appears to have been well done, and it is a pleasure to observe an attempt at a somewhat modernized terminology, and the use of metric measurements throughout. Engler and Prantl's System has been followed, and in nomenclature 'the so-called Kew and Berlin rules.' It must prove very helpful to students of northwestern Idaho and eastern Washington far outside of the limits covered.

The handy little book, 'Grasses,' by Dr. H. Marshall Ward, of Cambridge University (University Press, London), shows what may be done by a competent botanist in the way of making a difficult subject somewhat plain and not too technical. In less than two hundred small octavo pages the author gives a great deal of information, valuable not only to the student of grasses, but also to the practical man whose business it is to grow grasses for forage. There are chapters on the vegetative organs, anatomy, flowers and 'seeds' of grasses, followed in each case by a classification based on these characters alone. The book must be very useful in England and it suggests the need of a similar work for the United States.

#### POPULARIZING THE STUDY OF FERNS.

WHATEVER tends to increase the popular interest in plants is directly contributory to the advancement of science. Every book and every organization which stimulates an admiration and consideration of plants is to be encouraged by scientific men. Such a book is Mabel Osgood Wright's 'Flowers and Ferns in their Haunts' (Macmillan, New York), with its charming text, artistic cuts, and wonderfully accurate 'half-tone' reproductions of well-taken, well-selected, gray-mounted photographs of landscapes, where plants are shown in all their

glory. A chapter on 'The Fantasies of Ferns' is unequaled anywhere in fern literature. Not only is the text suited to the person whose mind 'is of the kindergarten order, that needs nice interesting object lessons,' but it will afford real pleasure and some instruction to the professional pteridologist, unless he has lost all sentiment, and love of the beautiful. It will prove a strong corrective for the mania which uproots every pretty, green thing. After reading it none but a confirmed vandal would wantonly disturb a colony of these beautiful plants.

Mrs. Wright's book may easily prepare the amateur for a more particular study of ferns, as suggested in Willard N. Clute's 'Our Ferns in their Haunts' (Frederick A. Stokes Co., New York). This is in fact a popular manual of the ferns of North America north of the Gulf States and east of the Rocky Mountains, and by the aid of an easy non-technical text, good cuts, and many 'half-tone' and colored plates, the subject is made so plain that no one need be without some knowledge of the ferns. It should find a place in the library of every amateur botanist, and it will do no harm to the professional botanist, who may well give it room on his shelves with other helpful books.

Why should not such books as these encourage those organizations which have for their object the cultivation of a love of Nature, and the protection of the native species? The Linnaean Fern Chapter of the Agassiz Association, which has recently issued its Eighth Annual Report (Miss Margaret Slossen, Secretary, Andover, Mass.) is such an organization of mostly amateur students of ferns. What a help such a society may become to the thousands of people who, away from herbaria and museums, desire to keep in touch with the work of others with like tastes. What an inspiration must come from membership in an organization whose members are scattered over the territory from Maine to California, and Canada to Florida and Texas, with one in England and another in far-away New Zealand.

A word may be said here in praise of a new society in Boston and its suburbs, named the 'Society for the Protection of Native Plants.' Its object is 'to check the wholesale destruction to which many of our native plants are ex-

posed.' Every botanist will wish this society the greatest success. Its secretary is Miss Maria E. Carter, Curator of the Herbarium of the Boston Society of Natural History. The urgent need of such a society is apparent not only in the densely populated Eastern States, but fully as much in the western summer resorts, where the hand of the vandal has already exterminated some species.

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*THE PRESERVATION OF COLORADO CLIFF DWELLINGS.*

THE Colorado Cliff Dwellings Association is endeavoring without aid from the legislature to preserve the ruins which lie on the Mesa Verde, a tableland twenty miles long by eight miles wide, in the southwest corner of Colorado. There are from three hundred to four hundred cliff dwellings including the noted 'Cliff Palace' on this mesa. These are all in the Ute Indian reservation and consequently the state or national government can not control the ruins. A ten years' lease has been made by the Association direct with the Ute Chiefs, by means of which control is had of the Mesa. The Secretary of the Interior having ratified the lease, the Association is now in charge of the ruins, and will open a toll road to them. The money received as toll will, however, be only part of the sum paid to the Indians as rent. The ruins will be kept from weathering and from the depredations of 'relic hunters.'

HARLAN I. SMITH.

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*PRESERVATION BEFORE THE FACULTY OF CANDIDATES FOR THE DOCTORATE AT THE UNIVERSITY OF PENNSYLVANIA.*

THE University of Pennsylvania inaugurated this year what seems to be in many respects an excellent method of recommending candidates for the degree of Doctor of Philosophy. The usual method, borrowed from the German universities, of examining candidates before the faculty or letting them defend their theses before the faculty is not altogether suited to existing conditions. In Germany it is chiefly a form and appears to be falling into disuse. The